

NMT AK Search - Procedure Review Sheet

(Attach additional pages as needed.)

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7/13/84 *JK* 9/30/99

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UCNI

TREATMENT OF EVAPORATOR "BOTTOMS"

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P/S Code: None

Diagram: Y X N

Chemical List: Y X N

(attach copies of "Y" responses)

Notes:

Summary: see "Introduction"

Exports: see cover sheet

Location: unknown

Wastes: supernatant and filtrate washes are combined and sent back to ion-exchange (LIR);

supernatant solns may be cemented under certain circumstances; salt waste is bagged out and drummed.

Evaporator

Return Completed Review Sheet and Attachments to the RMDC for capturing. Thank You.

Los Alamos
MST-12

PROCEDURE: 485-REC-ROO
DATE REVISED: NEW

TREATMENT OF EVAPORATOR "BOTTOMS"

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DATE ISSUED July 13, 1984

TREATMENT OF EVAPORATOR "BOTTOMS"

I. INTRODUCTION

"Bottoms" solution is the concentrate that results when a volume of ion-exchange effluents, oxalate filtrates, vacuum-seal water, or negative chilled waters that exceed discard limits are processed in Evaporator No. 2 and concentrated to a volume of 10-25 liters. Upon discharge from the Evaporator into the cooling slab tanks, the nitrate solution will "salt out." The solution in the slab tanks is allowed to cool to room temperature (~ 22°C) and then filtered through a 200-mesh stainless-steel screen filter. The salts are vacuum dried and packaged, or, depending on the nature of the feed (IXFS _____ RR; IX _____ OX _____; and IXFS _____ LR), are washed with concentrated nitric acid or water and then dried and packaged. The salts are double bagged, sealed, removed from the glove box, and placed in a lead-lined 55-gallon drum that has a polyethylene liner. When the drum is full, it is sent to 20-year retrievable storage.

II. CRITICALITY LIMITS

There may be no more than 1040 g of Pu in solution in any 30-in. x 60-in. section of the glove box.

There may be no more than 200 g of fissile material (Pu and/or U) in any 55-gallon drum.

III. EQUIPMENT

A. Equipment

1. Filter screen
2. Polyethylene bags
3. Filter boat
4. Nine-liter bottles (exterior coated with 1/16 in. film of polyvinyl chloride)
5. Disposable 1-ml pipettes

IV. PROCEDURE

A. Volume-Reduction Nitrate Salts

Volume-reduction feed consists of IXFS__RR, IXFS__LR, and IX__OX__ solutions that combined contain more than 50 g Pu per batch.

Calculation of "Bottoms" Solution Volume

1. Take three depth measurements of "bottoms" solution in slab tanks for volume calculations.
2. Calculate the volume of "bottoms" in the slab tanks by using an average of three depth measurements of the "bottoms."

$V = L \times W \times H$ where V is the volume of "bottoms," L and W are length and width respectively of the slab tanks, and H is the depth of the "bottoms" solution.

For slab tank (West) L = 116.69 cm; W = 30.18 cm.

For slab tank (East) L = 114.78 cm; W = 30.18 cm.

H = average of the three depth measurements.

Filtering "Bottoms" Solution

1. Insert a filtering screen into the slab tanks. Attach a flow line from the filtering screen to an evacuated 9-l bottle and transfer the supernatant solution into as many 9-liter bottles as needed. If the salts are unfilterable through the filtering screen, scoop the material directly into the filter boat for filtration.
2. If the filtering screen mesh has been used, transfer the nitrate salts to the filter boat when the supernatant solution has been removed from the salts in the slab tank.

Washing, Drying and Bagging Out Nitrate Salts

1. If there is more than 1 liter of nitrate salts, wash the salts with bulk nitric acid. Wash should be minimized; the number of washes should not exceed three. Notice the color of the salts before and after each wash because the color will determine the number of washes and their volume.

EXCEPTION: When washing nitrate salts derived from oxalate filtrates, bulk acid wash should be avoided because it would accelerate decomposition of any oxalic acid present in the salts and could result in pressurization of the sealed 55-gallon drum containing the salts. Nitrate salts from IXFS__OX or OXF__ solutions should be washed only with H₂O.

2. Into a tared sample bottle place ~ 5 g of washed salts for Pu Am analysis by CHM-1. After the bottle containing the sample has been removed from the sample port, weigh the bottle of sample to determine the weight of the salts. Request results to be reported in g/g.

3. Apply a vacuum to the filter through a 9-l bottle.

4. Vacuum dry the salts and package them in double plastic bags.

Sampling for Pu and Am Analysis

1. Take a 3-ml sample of the supernatant solution from each of the 9-l bottles and submit it to CHM-1 for Pu and Am analysis.

2. Combine the supernatant solution and filtrate washes and send this solution back to the Lean-Residue Ion-Exchange Column for Pu recovery.

Bagging Out and Packing Discard Drum

1. Bag out the salts.

2. Weigh the bagged-out salts.

3. Place the bagged-out salts in a 55-gallon drum that is lined with a 1/8-inch polyethylene liner that, in turn, is lined with 1/16-inch lead.

4. Enter data onto the Log Sheet.

5. Seal, weigh, and monitor the drum and take a lid-deflection reading to be compared with another deflection reading on the same lid taken at a later date. An increase in the deflection of the lid may indicate a pressure build-up within the drum.

6. Complete all PF/LASS computer transactions as CHM-1 assay values are received.

7. Attach a data sheet to each drum listing its contents with the weight and assay value for each item in the drum.

8. Code accountable material to the Count Room for 20-year retrievable storage and transport the drum to a designated location.

B. Routine Nitrate Salts

Calculation of "Bottoms" Solution Volume

This "bottoms" solution feed comes from IXFS F1 solutions containing no more than 50 g Pu per batch.

1. Take three depth measurements of "bottoms" solution in slab tanks for volume calculations.
2. Calculate the volume of "bottoms" in the slab tanks, using an average of the three measurements for the "bottoms."
 $V = L \times W \times H$, where V = volume of bottoms, L = length and W = width of the slab tanks, and H = the average of three depth measurements of the bottoms solution.

For slab tank (West), $L = 116.69$ cm; $W = 30.18$ cm.

For slab tank (East), $L = 114.78$ cm; $W = 30.18$ cm.

Filtration of "Bottoms" Solution

1. Insert a filtering screen into the slab tanks. Attach a flow line from the filtering screen to an evacuated 9-liter bottle and transfer the supernatant solution into as many 9-liter bottles as needed. If the salts are unfilterable through the filtering screen, scoop the material directly into the filter boat for filtration.
2. If the filtering screen has been used, transfer the nitrate salts to the filter boat after the supernatant solution has been removed from the salts in the slab tanks.

Drying and Packaging of Nitrate Salts

1. Apply a vacuum to the filter through a 9-liter bottle.
2. Vacuum dry the salts for a minimum of 15 minutes.
3. Package the vacuum-dried salts in double plastic bags. Note: If salts are of a gel-like consistency, they may require the addition of filteraid to absorb any moisture.

Sampling for Pu and Am Analysis

1. Take a 3-ml sample of supernatant solution from the 9-liter bottle and submit it to CHM-1 for Pu and Am analysis.

Transfer of Supernatant Solution to Cement Fixation Process

1. Transfer supernatant solution to the Cement Fixation Process in the following cases:
 - a. Foaming was evident during TS-2 processing,
 - b. Foaming was evident during dumping,
 - c. "Bottoms" are of a syrupy consistency and are unfilterable,

- d. The solution contains Pu-242 (MT 42),
- e. The "bottoms" contains uranium, and
- f. There is ~ 3 liters of salts present after filtration.

Contact Lead Technician if uncertain.

2. Supernatant solution containing no salts or Pu will be returned to V425A for further volume reduction. Contact Lead Technician if uncertain.

Bagging out Salts and Packing Discard Drum

1. Bag out salts. Weigh the bagged-out salts and record data.
2. Place the bagged-out salts in a 55-gallon drum lined with a 1/8-inch polyethylene liner that, in turn, is lined with 1/16-inch lead.
3. Enter data onto log sheet.
4. Seal, weigh, and monitor the drum and take a lid-deflection reading to be compared with another deflection reading on the same lid at a later date.
5. Attach a data sheet to each drum listing its contents and the weight and assay value for each item in the drum.

Recording Data on Computer

1. Complete all PF/LASS computer transactions as CHM-1 assay values are received.
2. Code accountable material to the Count Room for 20-year retrievable storage, and transport the drum to a designated location.